

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
PRIMARY WATER TANK ASSEMBLY #1 #2, ITEM 131, ITEM 162 ----- SV769592-30 (1)	2/1R	131FM01C  Bladder rupture.  Excessive cycling, defective material. Lack of krytox lubricant.	END ITEM: Oxygen entrained into the sublimator feedwater and the coolant loop.  GFE INTERFACE: Degradation in sublimator performance in proportion to the amount of entrained gas. Possible pump cavitation.  MISSION: Terminate EVA if cooling is insufficient or lost.  CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP.  TIME TO EFFECT /ACTIONS: Minutes. If cooling is insufficient, open purge valve to activate the SOP.  TIME AVAILABLE: N/A.  TIME REQUIRED: N/A.  REDUNDANCY SCREENS: A-PASS	A. Design - The bladder material is fluorel which exhibit outstanding flexibility, elasticity and elongation characteristics. Bladder processing is controlled to provide uniform product properties. The housing cavity walls consist of smooth surfaces. Bladders are lubricated with controlled quantities of krytox prior to bladder installation. The size ratio of bladder to cavity is approximately 1 to 1 which minimizes bladder stretching. The tank structure supports the bladder load when the water pressure is above the gas pressure.  B. Test - Component Acceptance Test - The item is internally leakage tested per AT-E-131-2 pressurizing the Item H20 inlet to 15.5 - 15.7 psig GN2. The O2 outlet is connected to a hose and the end of the hose submerged in H20. There shall be 0 bubbles in a 5 minute period. A bladder collapse leakage test is performed by pressurizing the O2 side of the bladders to 0.8 - 1.2 psig GN2. With the H20 side of the bladders connected to a hose and the outlet of the hose submerged in H20, the leakage shall be limited to 1 bubble/2 minutes. The pressure is increased to 15.3 - 15.7 psig GN2 and the leakage shall be the same. While the item is tested at Hamilton Standard, bladder pressurized time is recorded and tabulated. Pressurized time is the time when the water circuit is 3 psi or more above the gas circuit. Relief valves are placed in the H20 side and O2 side inlets to prevent accidental overpressurization.  PDA Test - A bladder collapse leakage test is performed by pressurizing the bladder (O2 side) to 14.6 - 15.7 psig GN2. With the H20 outlets connected to a hose and the hose submerged in H20, the leakage shall not exceed 1 bubble in 2 minutes. A water circuit leakage test is performed by pressurizing the water circuit to 15.7 - 15.9 psig H20. The leakage shall not exceed 6 scc/hr as measured with a volumetric micrometer for a 60 minute period.  Certification Test - Certified for a useful life of 25 years (ref. EMUM1-0106).  C. Inspection - The material used to manufacture the bladders is fully inspected to meet the material specification requirements. The bladders are 100% dimensionally inspected for outages, and 100% visually inspected for any surface defects. A leakage test is run to check every corner of the bladder for hidden defects. After the corners are checked, a leakage test is run to check the overall bladder for hidden defects and leaks. No leakage is allowed for either test. After the leakage tests, the bladders are 100% visually inspected for any defects resulting from the leakage. Prior to assembly, the amount of Krytox is 100% inspected to meet the requirements defined by an engineering approved visual standard.  D. Failure History - H-EMU-131-C009 (5/4/89), Cut in bladder during flash trimming operation caused internal leakage. Flash trimming process at manufacturer now incorporates cuticle scissors instead of a scalpel.

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		131FM01C	B-PASS C-PASS	E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Water Servicing, Leakage and Gas removal. None for EET processing.  F. Operational Use - Crew Response - EVA: If cooling is insufficient, terminate EVA. Training - Standard EMU training covers this failure mode. Operational Considerations - Flight rule A15.1.2-2 of "Space Shuttle Operational Flight Rules", NSTS-12820 defines go/no go criteria related to EMU suit thermal control. Generic EVA Checklist, JSC-48023, procedures Section 3 (EMU Checkout) and 4 (EVA Prep) verify hardware integrity and systems operational status prior to EVA. Real Time Data Systems allows ground monitoring of EMU systems.

EXTRAVEHICULAR MOBILITY UNIT  
 SYSTEMS SAFETY REVIEW PANEL REVIEW  
 FOR THE  
 I-175 CONNECTOR PLATE AND PIN  
 CRITICAL ITEM LIST (CIL)  
 EMU CONTRACT NO. NAS 9-97150

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